VO2JN-D

VOLTMETER, DIFFERENTIAL

1**. GENERAL.** This procurement requires a solid-state differential and conventional voltmeter capable of measuring ac and dc voltages.

2**. CLASSIFICATION.** Type II, Class 5, Style E, and Color R for Navy applications in accordance with MIL-T-28800 for shipboard applications. The relative humidity requirement is limited to 70% above 25°C and 80% below 25°C.

3**. MEASUREMENT REQUIREMENTS.** The equipment shall be capable of measuring ac and dc voltages in differential and conventional voltmeter modes within the ranges, accuracies, and sensitivities specified below. The equipment shall be average responding with an rms indication of ac signals.

3.1 **Differential voltmeter mode.** Ranges: AC - 1 mV to 1,100V. DC - 10 uV to 1,100V.

3.1.1 Null ranges. See table I.

TABLE I. Null Ranges.

Input Ranges	**Null Ranges**
1V 10V 100V 1,000V	0.001, 0.01, 0.1V 0.001*, 0.01, 0.1, 1V 0.01*, 0.1, 1, 10V 0.1*, 1, 10, 100V
* dc null range only	

3.1.2 Resolution. 10 uV or 10 ppm of range.

3.1.3 Differential mode frequency range. 5 Hz to 100 kHz. From 5 Hz to 20 kHz, the voltmeter shall measure voltages of 0.001 to 1,100 Vrms. From 20 kHz to 100 kHz, the measurement range shall be 0.001 to 110 Vrms.

3.1.4 Differential mode ac accuracy. See table II.

TABLE II. AC Accuracy (10 to 40°C).

Frequency Range	VAC Limits	AC Accuracy (% of Input)
5 Hz to 10 Hz	0.001 to 1,100	±(1% + 250 uV)
10 Hz to 20 Hz	0.001 to 1,100	±(0.5% + 100 uV)
20 Hz to 50 Hz	0.001 to 1,100	±(0.15% + 25 uV)
50 Hz to 20 kHz	0.001 to 110	±(0.1% + 25 uV)
50 Hz to 20 kHz	110 to 1,100	±0.15%
20 kHz to 50 kHz	0.001 to 110	±(0.15% + 25 uV)
50 kHz to 100 kHz	0.1 to 110	±0.5%
Note:Additional ac voltage inaccuracy due to temperature coefficient shall not exceed ±0.004%/°C over the temperature ranges of 0°C to 10°C and 40°C to 50°C.		

3.1.5 Differential mode dc accuracy. ±(0.02% of input + 0.001% of range + 10 uV) from 10°C to 40°C. Additional dc voltage inaccuracy due to temperature coefficient shall not exceed ±0.0015%/°C over the temperature ranges of 0°C to 10°C and 40°C to 50°C.

3.1.6 DC differential mode stability. The drift of the indicated voltage with respect to the measured input reference value shall not exceed the limits specified in table III.

TABLE III. DC Differential Mode Stability.

Any Period of:	PPM of Input
60 minutes	10
24 hours	20
30 days	40
1 year	90

3.1.7 Differential mode input RC and resistance. The ac input RC shall be at least 1 megohm shunted by less than 20 pF on all ranges. The dc input resistance at null shall exceed 100 megohms.

3.2 **Conventional voltmeter mode.** Range: AC - 1 mV to 1,100V. DC - 10 uV to 1,100V.

3.2.1 Conventional mode frequency range. 5 Hz to 100 kHz. From 5 Hz to 20 kHz, the voltmeter shall measure voltages of 0.1 to 1,100 Vrms. From 20 to 100 kHz, the voltmeter shall measure voltages of 0.1 to 100 Vrms.

3.2.2 Conventional mode accuracy. ±3% of full scale.

3.2.3 Conventional input RC and resistance. The ac input RC shall be no less than 1 megohm shunted by no more than 20 pF on all ranges. The dc input resistance shall be at least 100 megohms on the 0.1, 1, 10, 100, and 1,000V ranges and at least 10 megohms on the 0.001 and 0.1V ranges.

4. GENERAL REQUIREMENTS.

4.1 **Power source.** MIL-T-28800 nominal power source requirements are invoked. Maximum power consumption: 10W.

4.2 **Weight.** 10 kg (20 lb) maximum.

4.3 **Lithium batteries.** Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.